Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 15 of the Commission's Rules To Establish Regulations for Tank Level Probing Radars in the Frequency Band 77-81 GHz	)	ET Docket No. 10-23
	)	
and	)	
	)	
Amendment of Part 15 of the Commission's Rules To Establish Regulations for Level Probing Radars and Tank Level Probing Radars in the Frequency Bands 5.925-7.250 GHz, 24.05-29.00 GHz and 75-85 GHz	)	

COMMENTS OF KROHNE AMERICA, INC.

Krohne America, Inc. ("Krohne"), by its attorneys, submits these comments in response to the Further Notice of Proposed Rule Making in the above-captioned proceeding.[1]

Krohne applauds the Commission's efforts to adopt a comprehensive regulatory regime governing level probing radars ("LPR") and tank level probing radars ("TLPR").[2] However, as a leading manufacturer of TLPRs, Krohne submits that a few revisions to the proposed rules are required to account for TLPR technology and equipment parameters.

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[1] *Amendment of Part 15 of the Commission's Rules to Establish Regulations for Tank Level Probing Radars in the Frequency Band 77-81 GHz and Amendment of Part 15 of the Commission's Rules to Establish Regulations for Level Probing Radars and Tank Level Probing Radars in the Frequency Bands 5.925-7.250 GHz, 24.05-29.00 GHz and 75-85 GHz, Further Notice of Proposed Rule Making*, ET Docket No. 10-23, FCC 12-34 (rel. March 27, 2012) ("*FNPRM*").

[2] The term "LPR" is used herein to refer to level probing radars not installed inside enclosures, whereas the term "TLPR" is used to refer only to level probing radars installed in such enclosures (*e.g.*, metal tanks).

I. INTRODUCTION

Krohne is a leading worldwide manufacturer of process instrumentation and measurement systems, such as flow meters and level measurement devices used to measure tank inventory and storage. Krohne's products provide precise recording and control of liquid levels where such measurements are vital, including in the oil and gas, water, chemical, pharmaceutical, food and beverage, and mining and shipping industries. These devices not only increase industrial efficiency and quality controls, they also prevent accidents and spills that threaten public safety. Krohne has participated in several Commission proceedings regarding the rules for LPR and TLPR devices and will be directly affected by the outcome of this proceeding.

II. DISCUSSION

Krohne fully supports the adoption of new rules that will facilitate the manufacturing and sales of LPR and TLPR devices. Because the current rules do not adequately address these devices, manufacturers have been obliged to file a hodge-podge of rulemaking comments and waiver requests. Krohne understands that a single set of rules for both LPRs and TLPRs would seem efficient from a regulatory standpoint. However, there are in fact important differences between level probing devices that operate inside enclosed tanks and in the open-air.

There is no reason to deny TLPRs the advantages of RF attenuation resulting from the tank or require TLPRs to lower power, for example, by ignoring the existence of the tank. In addition, the Commission recognizes the importance of international harmonization repeatedly throughout the *FNPRM*, but the proposed rules do not in fact harmonize with international TLPR standards, only LPR standards. Harmonization is especially important for TLPRs that are mobile and are designed to travel across multiple regulatory jurisdictions (*e.g.*, on an oil or chemical tanker).

Krohne submits that a few revisions to the proposed rules for TLPRs are necessary to take advantage of operations inside a tank and international harmonization.

A. The 5.460-7.250 GHz Frequency Range

The Commission acknowledges the industry need for additional frequencies and wider authorized bandwidths to expand LPR applications and maintain and improve LPR accuracy and reliability.[3] Given that need, the 5.925-7.250 GHz frequency range proposed in the *FNPRM* should be extended to 5.460-7.250 GHz for TLPRs.[4]

First, the proposed wider bandwidth in this range will achieve greater resolution and more accuracy for TLPR devices. In a variety of proceedings, manufacturers such as Krohne have demonstrated that a wide bandwidth is necessary for operation of level probing radars.[5] As explained below, a wider bandwidth is particularly required for TLPRs installed in enclosed tanks. By extending the frequency range to 5.460 GHz only for TLPRs, the benefits of the greater bandwidth will be achieved while the risk of interference to other spectrum users is mitigated by confining the additional frequencies to enclosed installations.

Without a wider bandwidth, TLPRs cannot achieve the resolution levels necessary for precise measurements. A wider bandwidth permits TLPRs to better distinguish between closely adjacent targets. For example, a radar using a wider bandwidth is better able to distinguish between an echo emanating from the surface of a liquid, versus an echo coming from a nozzle.

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[3] *FNPRM* at ¶ 15.

[4] As noted in the *FNPRM*, LPRs and TLPRs are already permitted to operate at 5.925-7.250 GHz. *See FNPRM* at ¶ 15 fn 36.

[5] *See, e.g.*, Krohne America, Inc., Comments in ET Docket No. 06-216 filed on January 5, 2007; Measurement, Control & Automation Association, Comments in ET Docket No. 11-90 filed on July 18, 2011. The Commission also appears to accept the need for wider bandwidth as fact. *See, e.g., FNPRM* at ¶ 8 ("[L]PR devices need higher power and wider bandwidth than that permitted under the current rules to fully achieve the potential of radio frequency (RF) level-measuring technology. . . ").

The European Telecommunications Standards Institute ("ETSI") found that TLPR receivers will take up many undesired disturbance echoes originating from obstacles inside the tank, thereby reducing measurement accuracy. ETSI found that, in order to distinguish the surface echo of the substance being measured from these disturbing echoes, a "bandwidth as high as possible is required."[6]

Second, the extension to 5.460 GHz will facilitate international harmonization. The 5.460-5.925 GHz range is included in the TLPR ranges adopted by ETSI.[7] International harmonization promotes manufacturing efficiencies, lowers costs to end users and allows worldwide distribution.[8] Such distribution should be encouraged as TLPRs provide critical monitoring and control capabilities that protect life and property from overflows and like hazards. Harmonization is especially important to TLPRs that travel across multiple areas, such as oil tankers.

The *FNPRM* recognizes that the proposed rules depart from ETSI's frequency ranges. The Commission explains that it is taking a different approach by proposing the same bands for both LPR and TLPR applications and notes that the U.S. has restricted bands.[9] Krohne understands there is a certain regulatory ease in treating LPR and TLPR the same as they are similar devices. But the RF environment inside of a tank is unique. As explained above, the interior of the tank and various installations within (such as nozzles) cause unwanted echoes that

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[6] ETSI TR 102 347 V1.1.2, Annex B.3 (2005).
[7] *See* ETSI EN 302 372-1 V1.2.1 (2011-02).
[8] The Commission believes economies of scale are achieved by treating LPRs and TLPRs the same, in turn allowing manufacturers to market the same LPR device for a variety of RF level-measuring applications. *FNPRM* at ¶ 17 fn 39. However, the industry is more specialized than that. Krohne and other TLPR manufacturers need to take advantage of economies of scale by marketing harmonized TLPRs worldwide.
[9] *FNPRM* at ¶¶ 17-28, fns 39-40. Although the Commission suggests that parties may continue to seek waivers to use other frequency bands, the waiver process consumes time and resources and fails to provide regulatory certainty for planning and development purposes.

are not received in outdoor environments. The wider bandwidth helps mitigate this problem. In addition, the transmissions are confined within and directed down into the tank, reducing the risk of harmful interference to other users. Finally, the 5.460-5.925 GHz band does not include any restricted frequencies in the U.S.[10]

Lastly, Krohne has operated its TLPR devices for years with no reports of harmful interference from other spectrum users. There is no justification to withhold these important frequencies from TLPRs operating in the U.S. The Commission's only two stated rationales do not apply here. There is no reason the frequency ranges for TLPRs cannot slightly differ from those for LPRs given the significant difference in their installations. And the restricted bands are not impinged.

B. Limits and Measurements

The *FNPRM,* in recognizing the benefits of global harmonization, proposes to adopt ETSI's radiated emission limits. However, ETSI does not treat LPRs and TLPRs under the same emission standards, as proposed in the *FNPRM*. The ETSI limits proposed in the *FNPRM* apply only to LPRs. In particular, for the 5.925-7.250 GHz band, the Commission proposes an equivalent average reflected emissions limit of -55 dBm/MHz – yet this figure is based on ETSI's work with LPRs only and should therefore apply only to LPRs. To truly harmonize, the Commission should adopt the ETSI limit of -41.3 dBm for TLPRs, which is the current limit in Section 15.209. There is no reason to deny TLPRs the benefit of harmonization, particularly when the emission limits in the Commission's current rules can be met.

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[10] *See* 47 C.F.R. § 15.205. The closest restricted band ends at 5.460 GHz. The Commission previously granted Krohne a waiver to operate within the restricted bands at 9 GHz. *See* letter of October 26, 2001, from Bruce A. Franca to Fish & Richardson, in *Revision of Part 15 regarding Ultra-Wideband Transmission Systems,* ET Docket 98-153, *First Report and Order*, 17 FCC Rcd. 7435, 7450 (2002) fn 81 ("*Krohne Waiver*").

Furthermore, like ETSI, the Commission should permit TLPR manufacturers to demonstrate compliance through a representative test tank in all TLPR frequency bands (including the extended 5.460-5.925 GHz band discussed above). The Commission has previously allowed Krohne to test in a representative tank[11] and the process has been successful, with no reports of interference. The Commission has also previously suggested that emission tests for TLPRs could be performed at an open area test site (OATS).[12] Krohne agrees with the Commission that *in situ* testing at multiple sites is simply too cumbersome. It also creates a serious delay in the availability of the new and advanced generations of these devices. On the other hand, a small representative test tank shows the worst case scenario as the energy is more concentrated in the smaller tank.

Krohne recognizes that tanks may be made of various materials.[13] In order to limit concerns over tanks that provide little RF attenuation, Krohne suggests that a TLPR using the representative tank testing method must be located in an enclosed metal tank and tested at an OATS. This procedure will afford TLPRs manufacturers the benefits of RF attenuation inside enclosed, metal tanks, but is appropriately limited to eliminate interference concerns. It also tracks TLPR testing methods adopted by ETSI and by the Commission on prior occasions.

C. Antenna Beamwidth

With respect to antenna beamwidth requirements, the *FNPRM* again fails to distinguish between LPRs and TLPRs, creating compliance difficulties for TLPRs. The Commission proposes that *all* LPRs and TLPRs must use an antenna with a maximum half-power beamwidth

[11] *See Krohne Waiver*.
[12] *See Amendment of Part 15 of the Commission's Rules To Establish Regulations for Tank Level Probing Radars in the Frequency Band 77-81 GHz, Notice of Proposed Rulemaking and Order,* ET Docket Nos. 10-23, 06-216 and 07-96, 25 FCC Rcd 601, 609 (2010).
[13] *See FNPRM* at ¶ 28 fn 65.

of 12 degrees within the 5.925-7.250 GHz and 24.05-29.00 GHz bands and 8 degrees within the 75-85 GHz band. These limits create a practical problem for TLPRs. A small beam antenna, which consequently has a large aperture diameter, will not necessarily fit into existing pre-drilled openings of tanks, which often go down to 50 mm and even smaller. Again, the issue arises by attempting to treat open-air LPRs and TLPRs the same, when there is no reason to do so. The small beam antenna specification was designed to protect other spectrum users from open-air LPRs and is not required when the emissions are attenuated and contained within a tank.

III. CONCLUSION

Krohne appreciates the Commission's efforts in developing a new set of rules for LPR and TLPR devices. Such rules will eliminate regulatory uncertainty and the delays associated with waiver requests and piecemeal rulemakings. Further, as a global manufacturer, Krohne welcomes the Commission's move toward international harmonization for this industry. However, harmonization will be truly achieved only by distinguishing between LPRs and TLPRs for certain technical rules, as explained above. With a few adjustments to the proposed rules, the Commission can facilitate TLPR technology that will benefit critical industries, aid in the protection of life and property and pose no threat of harmful interference to other spectrum users.

Respectfully submitted,

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